



Recent Projects

- **Athena**
 - EM1TRK, Bad Runs, Luminosity, Skimming
- **L1 CAL Upgrade - BLS-to-ADF Transition System & Test Stand**
 - New racks & cable mock-up
 - Schematics and layouts
 - Wiring & cable labelling

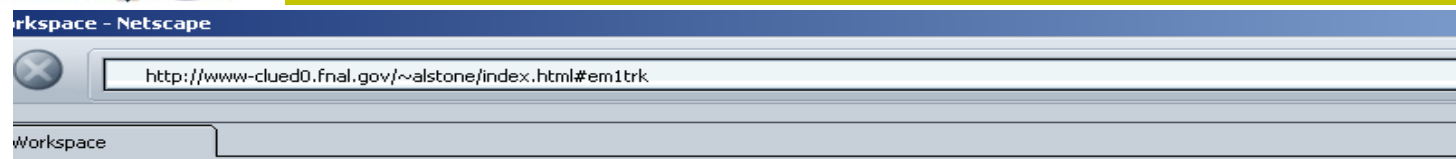


Athena

- V01-05-02 - tagged 26 June 2004
 - Includes changes made by Suyong, Alan and James
 - 3 Jet branches
 - JES corrected
 - JES+Muon corrected
 - Uncorrected - for Jet Reco studies
 - L1, L2 and L3 trigger branches for efficiency studies
 - Track, electrons, vertexing, missing ET
 - D0correct v00-00-06
 - Compiled with p14.06.00, maxopt
- Next version (p16.04, integrated d0correct)
 - Nearly ready, but no significant code changes
 - Will need once the pass2 skims are available



TMB Pass1 EM1TRK Skim



p14 1EMTRK

| 21 April 2004 - 28 June 2004 (Runs 192165 - 194566) | | | | | |
|---|--------------------------------------|---------|------------|-----------------|---|
| Skim | SAM Dataset | # Files | # Events | Subsets by Tape | Job Script |
| EM1TRK | p14.em1trk.post.02 | 254 | 9,377,349 | 45 | run_em1trk.post_apr2004 |
| 25 November 2003 - 21 April 2004 (Runs 185746 - 192159) | | | | | |
| Skim | SAM Dataset | # Files | # Events | Subsets by Tape | Job Script |
| EM1TRK | p14.em1trk.post.01 | 665 | 12,280,693 | 158 | run_em1trk.post_nov2003 |
| 20 April 2002 - 7 September 2003 (Runs 151816 - 180956) | | | | | |
| Skim | SAM Dataset | # Files | # Events | Subsets by Tape | Job Script |
| EM1TRK | p14.em1trk.01 | 765 | 32,137,764 | 142 | run_em1trk |
| 4 October - 6 December 2002 (Runs 165600 - 168954) | | | | | |
| Skim | SAM Dataset | # Files | # Events | Subsets by Tape | Job Script |
| EM1TRK | p14.em1trk.catch.r13 | 14 | 653,723 | NA | run_em1trk_r13 |

Use python script to create SAM dataset definitions by tape & job script. Easier to keep track of completed jobs or restart failed jobs.

Another script does the bookkeeping.

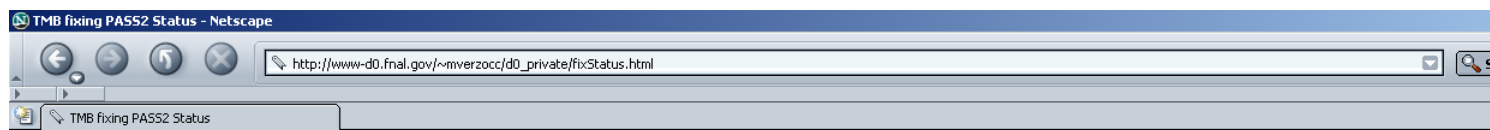
This section was last modified on Thu Aug 26 16:06:15 CDT 2004.



TMB Pass2 Fixing & Skimming

Pass2 will include t42 corrections.

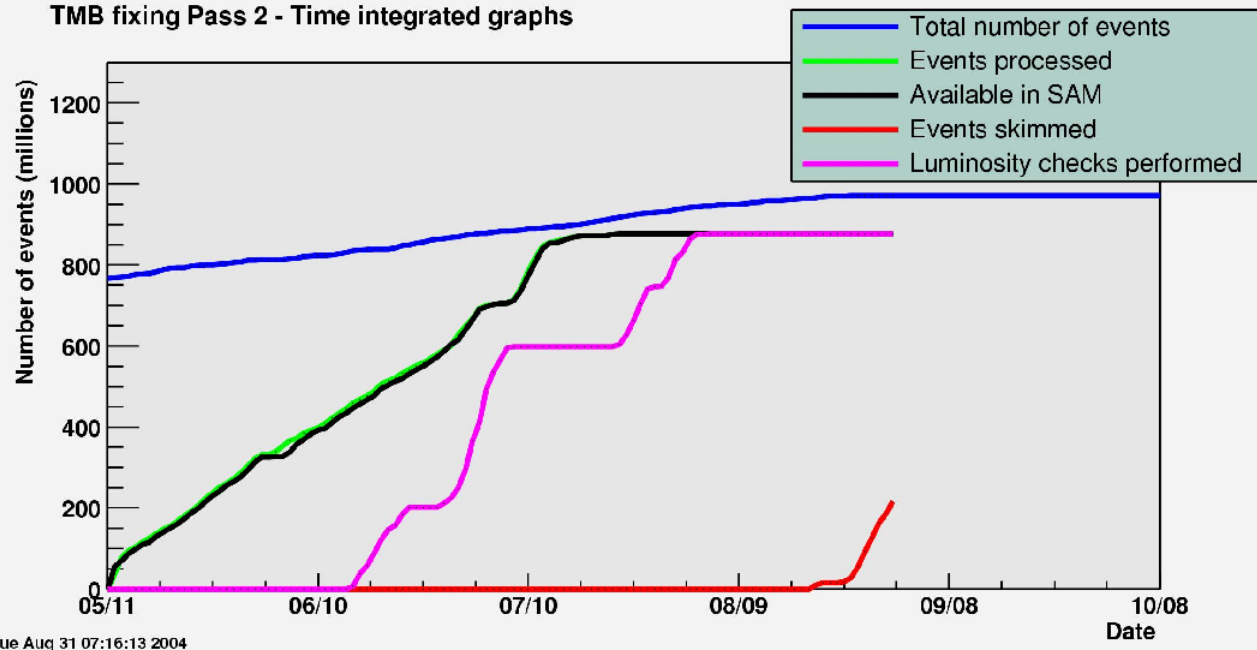
Fixing is nearly complete, but skimming is not.



TMB fixing PASS2 Status

| TMB fixer Pass2 Status (all versions) on 31 Aug at 19:14 | | | | |
|--|-----------|--------|--|--|
| Total Events | 971774113 | | | |
| Processed Events | 875838800 | 90.13% | | |
| Events in SAM | 875838800 | 90.13% | | |
| Skimming | 232298773 | 23.90% | | |
| Luminosity checks | 875838800 | 90.13% | | |
| Total Files | 57743 | | | |
| Processed Files | 51843 | 89.78% | | |
| Fixed Files in SAM | 51843 | 89.78% | | |
| Skimmed files | 13993 | 24.23% | | |
| Lumichecked files | 51843 | 89.78% | | |

TMB fixing Pass 2 - Time integrated graphs





EM1TRK Athena root-tuples

http://www-d0.fnal.gov/~alstone/D0Work/athena.html#p14data

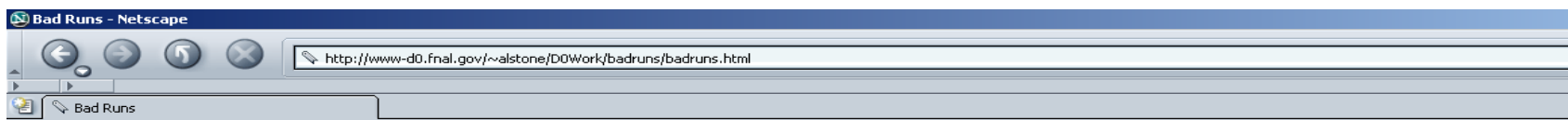
• Current status of the p14 EM1TRK root-tuples:

| All EM1TRK: 20 April 2002 - 28 June 2004 (Runs 151817 - 194566) | | | | | |
|---|------------|---------------|------------|----------------|--------------------------------|
| Athena | # Events | # Root-tuples | Disk Space | Avg Event Size | Macro Chain |
| v01-05-02 | 54,431,899 | 803 | 309.27 Gb | 5.68 kb | run_em1trk_all_skim.C |
| 21 April 2004 - 28 Jun 2004 (Runs 192165 - 194566) | | | | | |
| Location: /rooms/flames/Athena/v01-05-02/em1trk-post-apr2004/ | | | | | |
| Athena | # Events | # Root-tuples | Disk Space | Avg Event Size | Macro Chain |
| v01-05-02 | 9,377,349 | 133 | 58.98 Gb | 6.29 kb | run_em1trk_post_apr2004_skim.C |
| 25 November 2003 - 21 April 2004 (Runs 185746 - 192159) | | | | | |
| Location: /rooms/flames/Athena/v01-05-02/em1trk-post-nov2003/ | | | | | |
| Athena | # Events | # Root-tuples | Disk Space | Avg Event Size | Macro Chain |
| v01-05-02 | 12,263,063 | 369 | 71.05 Gb | 5.79 kb | run_em1trk_post_nov2003_skim.C |
| 20 April 2002 - 7 September 2003 (Runs 151817 - 180956) | | | | | |
| Location: /rooms/flames/Athena/v01-05-02/em1trk/ | | | | | |
| Athena | # Events | # Root-tuples | Disk Space | Avg Event Size | Macro Chain |
| v01-05-02 | 32,137,764 | 291 | 175.86 Gb | 5.47 kb | run_em1trk_skim.C |
| 4 October - 6 December 2002 (Runs 165600 - 168954) | | | | | |
| Location: /rooms/flames/Athena/v01-05-02/em1trk_r13/ | | | | | |
| Athena | # Events | # Root-tuples | Disk Space | Avg Event Size | Macro Chain |
| v01-05-02 | 653,723 | 10 | 3.37 Gb | 6.29 kb | run_em1trk_r13_skim.C |

- Root-tuples produced by both James and Alan
- Runs 151817-194566 - through v12 trigger list - taken 20 Apr 2002 - 28 Jun 2004
- 54.4 million events - less than 0.1% duplication
- 803 root-tuples using 309 Gb of disk space - average 5.7 kb event size
- Effort was made to reduce event size from 10.6 to 5.7 kb while adding new information for the trigger



Bad Runs Page



| Intro | CAL | CFT | CalJetMet | L1CAL | SMT |
|-------|-----|-----|-----------|-------|-----|
|-------|-----|-----|-----------|-------|-----|

| |
|-------------------|
| Athena |
| Clued0 Workspace |
| Physics Page |
| Higgs |
| Dilepton + Jets |
| Marc's Analysis |
| CAB |
| d0tools |
| RECO |
| SAM |
| clued0 |
| Common Sample |
| Data Tier |
| Agenda Server |
| List Server |
| Runs & Stores |
| Run II Luminosity |

Intro

- The [Offline Run Quality Database](#) was queried for the quality flag "BAD" for the detector/ID groups of CAL, CFT, Jet/MET & SMT.
- More information can be found on the [D0 Data Quality](#) web page.
- Lists of bad runs culled from the full set of physics runs from 19 April 2002 to the present (Runs ≥ 151816) have been generated separately. These lists need to be reviewed periodically as:
 - More physics runs are recorded and reconstructed
 - Better discriminating algorithms are used to select bad runs
 - New corrections are applied to data to minimize bad runs

This section was last modified on Mon Aug 30 13:33:01 CDT 2004.

- Combined CAL+CFT+SMT bad run [list](#) and [macro](#) through all physics run range.
- Combined CAL+CFT+L1CAL+SMT bad run [list](#) and [macro](#) through all physics run range.
- [fill_badruns](#) script that I used to make the combined lists and macros.

CAL

- [Run Quality output](#) for Calorimeter Bad Runs
- [Descending List](#) of Calorimeter Bad Runs
- [Root Macro function](#) with Calorimeter Bad Runs

This section was last modified on Thu Jul 29 12:47:21 CDT 2004.

- See the [Calorimeter Data Quality](#) web page maintained by Viatcheslav Shary and Laurent Duflot.

CFT

- [Run Quality output](#) for Tracking & Preshower Bad Runs
- [Descending List](#) of Tracking & Preshower Bad Runs
- [Root Macro function](#) with Tracking & Preshower Bad Runs

This section was last modified on Mon Aug 30 13:33:01 CDT 2004.

- The [Tracker & Preshower data quality](#) is monitored by Marj Corcoran.

CalJetMet

- Data quality is analyzed at the resolution of Luminosity Block Numbers (LBN) without t42 in killer mode.
- [Pre-Shutdown](#) for Run Range 151817-180956 last updated 25 June 2004.

cal_event_quality is used to identify: "ring of fire", "coherent noise" and "empty crate" events.



Bad Runs & Bad LBNs

- Used Run Quality Database to compile a list of bad runs based on detector criteria for CAL, CFT and SMT
 - Not perfect. About half are non-physics runs. There is no easy mechanism to remove non-physics runs from the list.
 - 1213 bad runs in aggregate, but only ~650 are physics runs
- Removed early runs for which the L1 CAL trigger did not have full central calorimeter coverage
 - Additional 24 runs not already flagged bad by CAL, CFT and SMT
- Bad LBN list from CalJetMet quality
 - Without t42 - using one list for Runs 151817 -180956 and another list for Runs 185746 - 194566 (last v12 run)
- Run 161977 (15 Aug 2002) is the first “good” run with non-zero luminosity for a single EM high-pT trigger to be used in our analysis



Luminosity

- Run Range Luminosity method for diEM trigger

| | EM1TRK | | |
|-----------------|---------------|--------------|---------------|
| | E1_2L20 | 2EM_HI | Diem Total |
| Delivered | 246.7256 pb-1 | 178.944 pb-1 | 425.6696 pb-1 |
| Recorded (all) | 227.2635 pb-1 | 150.122 pb-1 | 377.3855 pb-1 |
| Recorded (good) | 201.4615 pb-1 | 119.354 pb-1 | 320.819 pb-1 |

- Method to OR multiple unprescaled single EM triggers
 - Same bad run and bad LBN lists. Same run range. Same skim.

| Single EM Lumi Results | |
|------------------------|--------------------------|
| First Run | 161977 |
| Last Run | 194566 |
| Recorded | 321.967 pb ⁻¹ |



Skimming Athena Root-tuples

- It will take 10-12 hours to process the 54 million events and 803 root-tuples to make histograms
 - Sometimes this is a necessary evil when doing efficiencies or optimizing cut, but for most work, you don't need this full dataset

| | | | | |
|--|-------------------|-------------------|------------------|-----------------------|
| Data: 20 April 2002 - 28 June 2004 (Runs 151817 - 194566) | | | | |
| Location: /rooms/flames/alstone/skims/v01-05-02/em1trk/ | | | | |
| Cuts: 1 EM object with $\text{emf} > 0.9$, $\text{iso} < 0.15$, $\text{hm} \times 7 < 12$, Track Match, CC-only | | | | |
| Athena | Macro | # Original Events | # Skimmed Events | # Skimmed Root-tuples |
| v01-05-02 | run_em1trk_skim.C | 54,431,899 | 1,784,949 | 7 |
| Cuts: 1 EM object with $\text{emf} > 0.9$, $\text{iso} < 0.15$, Track Match, $p_T > 25$ | | | | |
| Athena | Macro | # Original Events | # Skimmed Events | # Skimmed Root-tuples |
| v01-05-02 | run_em1trk_skim.C | 54,431,899 | 1,374,437 | 7 |

- Note: The EM1TRK skim requires at least one EM object with $p_T > 8$ GeV.
- Note: An EM fraction greater than 90% is already required for the leading EM object(s) with ID=10 or 11 in the EM skims - 1EMloose, EM1TRK, 2EM, 2EMhighpt.



Miscellaneous Details

- Looking at the L1, L2 and L3 trigger cross sections run by run for anomalies
 - Have some preliminary numbers and plots, but will reserve that material for another week
- Sent email to database group for method to AND store and physics trigger list meta data with run quality
- Sent email to D0 Higgs group with details on EM1TRK skimmed thumbnails, Athena root-tuples and luminosity summary
 - Invitation for others to use
- Keeping up with Data Format Working Group
 - Will eventually make Athena root-tuples obsolete
- Optimization of electron cuts (hmx7 for example) for Z+jets analysis



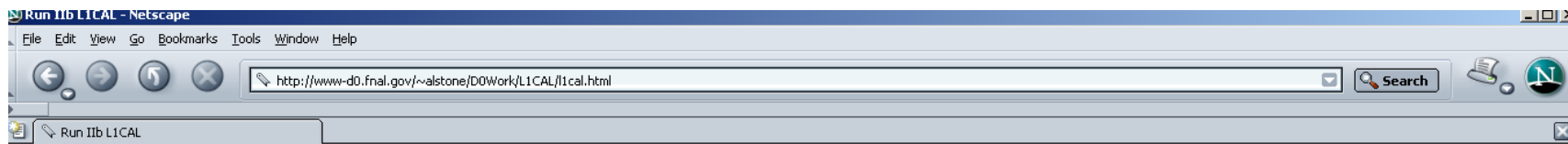
L1 CAL Upgrade

BLS-to-ADF Transition System

- Pass signal from existing 1280 BLS trigger cables to new ADF crate backplanes
 - Fully documented in pending D0 Note
- Need careful mapping of each conductor - signal and ground
 - Mario has a massive spreadsheet
- New rack layout for MCH1
 - Cooling is still a concern. Existing cables major constraint.
- Require rigorous testing of all new passive electronics and cables
 - Prototype cables are here. Patch panel and paddle cards are in the last stage of layout. Should have stuffed boards in <10 days.
- Mock-up of patch panels and cables to understand cable flow and strain relief, cable lengths, etc.
 - Already have new racks, patch panel templates, scrap cables
- Relabel existing BLS cables - new destination
 - Provide outside company with format and text



My L1 CAL Web Page



Run I1b L1CAL

Questions, comments and requests should be sent to the [Alan L. Stone](#)
Last modified: Mon Aug 30 13:26:03 CDT 2004

BLS-ADF Transition System

Racks, Crates & Cables

L2

Photos

Archives

[Alan Stone
UIC](#)

[Dan
Edmunds
MSU](#)

[Hal Evans
Columbia](#)

[Fermilab
PPD/EED](#)

[Run I1b
Trigger
Upgrade](#)

[Agenda
Server](#)

[List Server](#)

[Runs &
Stores](#)

[Run II
Luminosity](#)

BLS-ADF Transition System

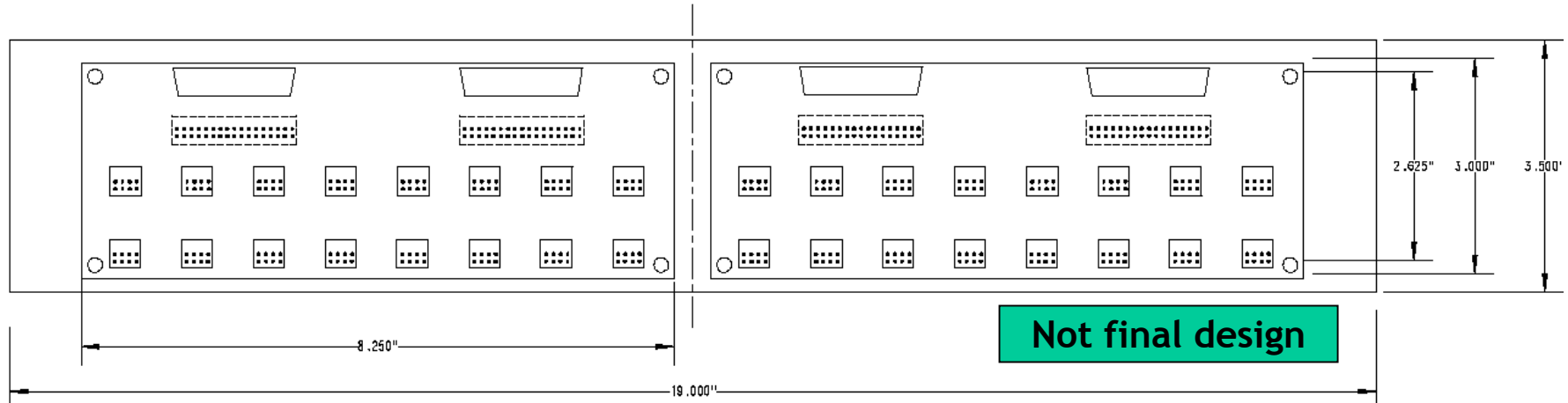
- 2004-08-23: The requisition was approved to get an outside contractor (George Wolf) will finish the layout of the patch panel card and the paddle card. We were losing manpower because of the current shutdown, so relying on D0 technicians would have delayed the schedule. The revised artwork should come back by Aug 31.
- 2004-08-16: [Power output](#) from the ADF and VME Control crates provided by Dan Edmunds.
- 2004-08-12: Nine pleated foil cables have arrived and passed Johnny Green's inspection. They are about 9.5 feet instead of 10 as they were shortened to reconnectorize.
- 2004-08-06: Email discussion on [rack power needs](#) for the new L1 CAL trigger.
- 2004-08-05: [Answers on grouding issues](#) for the patch panel and paddle card from Dan Edmunds.
 - 2004-08-10: [Response from John Anderson](#).
 - 2004-08-10: Speaking with Dan on the phone - the 10k ohm resistor for the monitoring effectively removes all signal components faster than 1 micro-second. Dan proposes using a 500 ohm resistor instead.
- 2004-08-04: Discussions between Alan Stone, Mario Camuyrano and John Fogelsong to clarify the relationship between the channel spreadsheet and the engineering schematics. Mario has agreed to revise his Excel spreadsheet to include the following for each of the 1280 BLS trigger cable inputs:
 - New MCH1 Rack (103-112)
 - Patch panel bulkhead (1-40)
 - Patch panel card (1-80 or 1A,1B...40A,40B)
 - Patch panel input (32 per patch panel bulkhead)

Engineering Schematics

- [Patch Panel](#) - Bulkhead for BLS input, pleated foil output (to paddle board) and test points.
- [Block Wiring](#) - All signal and ground lines for 16 trigger towers from BLS cable to patch panel to pleated foil to paddle card to ERNI connector to ADF backplane.
- [Paddle Card](#) - Input from two pleated foil connectors, and output to ADF backplane via ERNI connector.
- [MCH1 Rack Layout](#) - Distribution of patch panels and crates for the new trigger



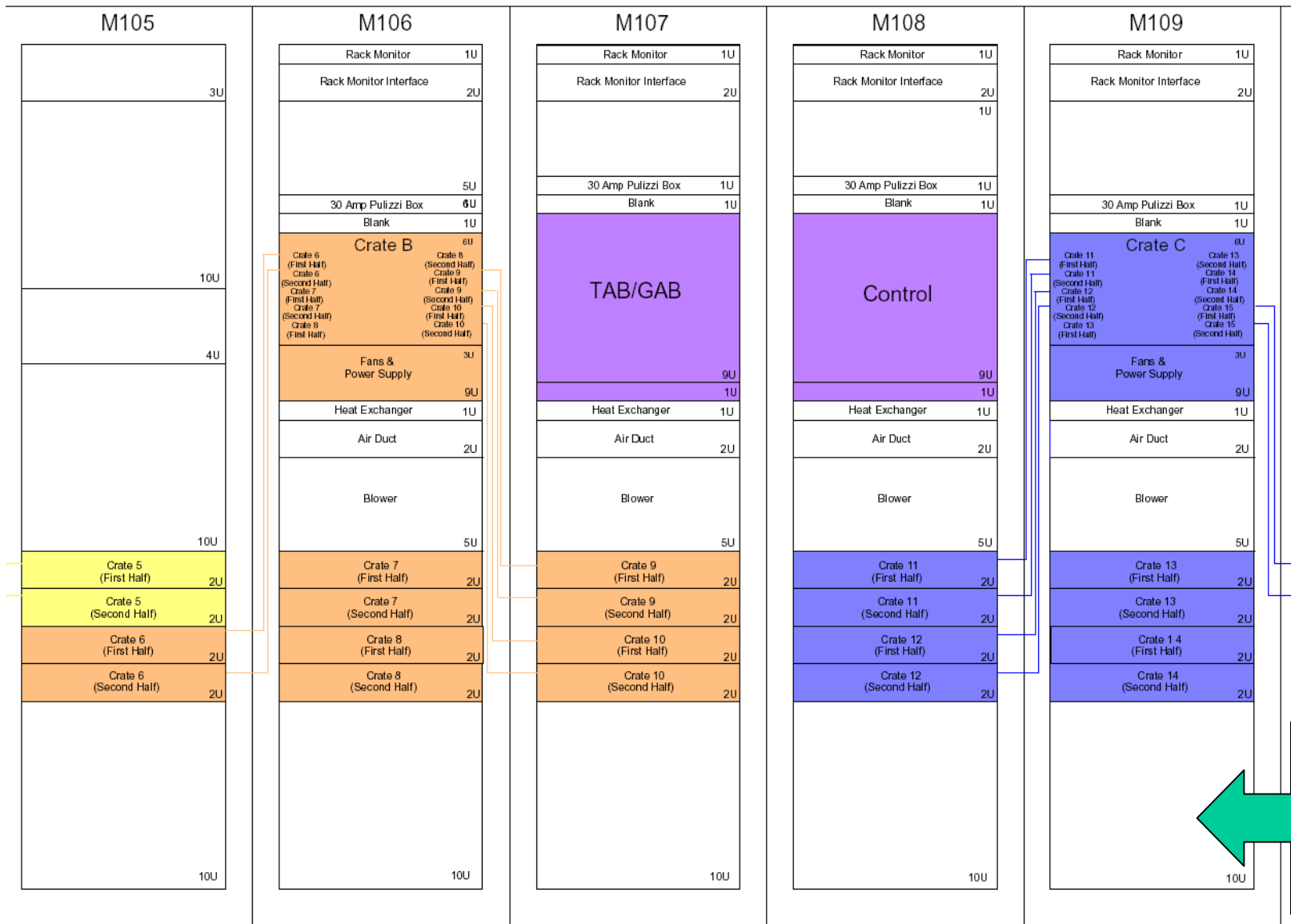
Patch Panel



- **Need 40 Patch Panels (PP) - four in each rack.**
 - We are considering mounting the PP to a drawer.
 - Two patch panel cards (PPC) - stuffed printed circuit boards - for each PP. The cables plug into the connectors from inside.
 - 16 BLS input cables - for each trigger tower (TT) - and 2 pleated foil output cables for each ADF.
 - 4 monitor connectors accessible from outside. Expert can plug in a scope (even during physics data taking!) to monitor or debug a problem or feature.



MCH1 Rack Layout



No cooled
air below
racks!



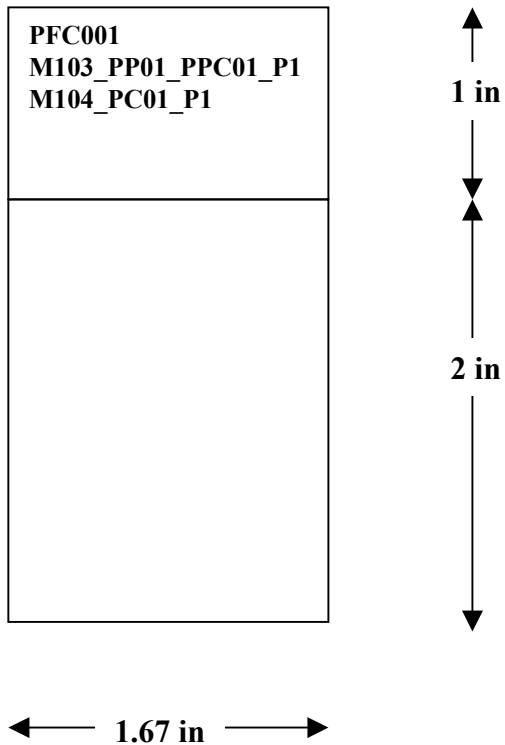
Test Stand



- Test stand area has wooden platform floor to prevent any ground faults
- Racks lowered from DAB3 last week
 - Have 5. Will need 10.
- 2 patch panels and template PCBs for 4 patch panel cards have been prepared
- Blue cable is exact type of existing BLS trigger cables
 - Cut 16 ten-foot lengths
- Preparing mock-up of cables and patch panels using rack layout specs
 - Need help!
- Need to prepare a setup to test passive electronics and cables
 - Have scope and pulse generator
 - Need help!



Labels



- Label name
- Origin
- Destination
- Pleated Foil (left): 160 x 2
 - One label for each end of 10 foot cables
 - PFC001 = Pleated Foil Cable 1 (of 160)
 - M103 = MCH Rack 103 (103-112)
 - PP01 = Patch Panel 1 (of 40)
 - PPC01 = Patch Panel Card 1 (of 2)
 - P1 = Connector 1 (of 2)
 - PC01 = Paddle Card 1 (of 80)
- BLS Trigger: 1280 x1
 - Cannot access platform end of detector
 - Will not remove or cover old labels



Remaining Concerns

- Do not have the TAB/GAB power supply dimensions and power input/output needs
- Sufficient cooling for ADF crate?
 - Dan Edmunds has supplied power estimates
- Rearrange test stand
 - Large wooden crates will be removed shortly
 - Need to place racks close to the power outlets
 - Move desks and tables elsewhere
- Mock-up - should only be 1-2 days of dedicated effort
 - What is the best way to route cables?
 - Do not know how much slack is in the BLS trigger cables
- Transition system testing
 - Full time effort. Who will do this? Needs to be done immediately after patch panel and paddle cards prototypes arrive.
 - Drives schedule for full schedule production
 - Continuity tests for starters, then pulse generator and/or Calorimeter preamp pulser to check signal path up to ADF crate
 - Involve Dan Edmunds for advanced study of signal integrity, reflection, noise, etc.